DEPARTMENT OF THE ARMY
FORT ORD OFFICE, ARMY BASE REALIGNMENT AND CLOSURE
P.O. BOX 5004, BUILDING #4463 GIGLING ROAD
MONTEREY, CALIFORNIA 93944-5004

REPLY TO
ATTENTION OF

APR 8 2005

Fort Ord BRAC Office

Roman Racca
Cal. Environmental Protection Agency
Dept. of Toxic Substances Control
8800 Cal Center Drive
Sacramento, California 95826-3200

Approval Memorandum
Proposed Interim Action Excavation
IA Areas 39A HA-80, and 39A HA-85
Site 39A, East Garrison Ranges
Former Fort Ord, California

Dear Roman Racca:

This letter presents the Approval Memorandum for Interim Action (IA) Areas 39A HA-80 and 39A HA-85 of Site 39A - East Garrison Ranges, at the former Fort Ord, California. These IA areas were identified during site investigation activities conducted under the former Fort Ord Basewide Range Assessment (BRA) program. The BRA designated these areas as historical areas (HA) HA-80 and HA-85. An interim action was previously completed at adjacent IA Areas 39A1 through 39A9, (*Interim Action Confirmation Report, Site 39A - East Garrison Ranges, Former Fort Ord, California*, dated October 16, 1998). Copies of this letter have been sent to the United States Environmental Protection Agency (USEPA) and departments of the California Environmental Protection Agency (Cal/EPA), including the Central Coast Regional Water Quality Control Board (RWQCB), and the Department of Toxic Substances Control (DTSC).

Interim action excavation activities are proposed for Site 39A. These activities will be performed in accordance with the approved *Interim Action Record of Decision, Contaminated Surface Soil Remediation, Fort Ord, California* (IAROD), dated February 23, 1994.

The IAROD outlined a process and established necessary site criteria for identifying and approving potential areas for IA excavations. This Approval Memorandum details the screening process used to evaluate IA Areas 39A HA-80 and 39A HA-85 and demonstrates the compatibility of the area with the site-qualified criteria established in the IAROD. A completed site eligibility checklist that demonstrates this area's conformance with IAROD site criteria is presented in Table 1.

Characterization Report Summary for HA-80 and HA-85

MACTEC prepared the *Revision C Comprehensive Basewide Range Assessment Report, Former Fort Ord* (July 30, 2004), which included the results of the site characterization conducted at several locations including HA-80 and HA-85. HA-80 and HA-85 are located within Installation Restoration Program (IRP) Site 39A which is on the eastern side of the former Fort Ord (East Garrison), at the eastern end of Inter-Garrison Road (Plate 1). HA-80 was identified as a landscape target range on the 1940 Camp Ord

map showing the Ultimate Layout of Concurrent Training Areas. The range is also shown on the July 15, 1941 (revised January 28, 1942) map. The range is not identified on the 1946 Fort Ord Master Plan or later maps. HA-85 was identified as a 50-yard rifle range on the 1940 Camp Ord map showing the Ultimate Layout of Concurrent Training Areas. The range is also shown on the July 15, 1941 (revised January 28, 1942) map. The range is not identified on the 1946 Fort Ord Master Plan or later maps.

- **Characterization.** HA-80 was identified for site characterization based on the results of a site reconnaissance and site investigation sampling. No spent ammunition was evident during the site reconnaissance. The range was heavily overgrown with poison oak, making the ground surface difficult to map. Because possible range features were identified in this area and the ground surface was difficult to see, soil sampling was recommended for this range. Site investigation sampling was conducted at four locations within HA-80 in August 2001 (Plate 2). Soil samples were analyzed for lead, copper and antimony. Concentrations of lead exceeded the Fort Ord preliminary remediation goal (PRG) of 240 mg/kg at one of the four sample locations (H80HSI0001). Lead concentrations were as follows: 416 mg/kg in the surface sample, 263 mg/kg in the 1-foot sample, and 257 mg/kg in the 2-foot sample. Concentrations of copper and antimony were below Fort Ord PRGs in all samples. Characterization sampling was conducted to further evaluate the extent of elevated lead concentrations detected in soil samples collected from location H80HSI0001. Sixteen surface soil samples and one duplicate sample were collected in the vicinity of the four previous site investigation sample locations. Lead concentrations in seven of the sixteen sample locations (H80HSC0005, H80HSC0007, H80HSC0008, H80HSC0010, H80HSC0011, H80HSC0014, and H80HSC0016) were above the Fort Ord PRGs.

  HA-85 was identified for site characterization based on the results of a site reconnaissance and site investigation sampling. An eight to ten foot high berm was mapped on the southeast side of the area during site reconnaissance (Plate 2). Two additional smaller berms, one 1 to 2 feet tall and one 4 to 6 feet tall were also mapped. A concrete lined pit was mapped at the southern end of the range. This was most likely for a moving target. Concentrations of spent ammunition were not evident in this area. The area is heavily vegetated with poison oak, making the ground surface difficult to map. Because possible range features were identified in this area and the ground surface was difficult to see, soil sampling was recommended for this range. Site investigation sampling was conducted at eight locations within HA-85 in August 2001. Soil samples were analyzed for lead, copper, and antimony. Concentrations of lead exceeded the Fort Ord PRG of 240 mg/kg at two of the eight sample locations (H85HSI0009 and H85HSI0022). At location H85HSI0009, lead concentrations were as follows: 1,460 mg/kg in the surface sample, 2,790 mg/kg in the 1-foot sample, and 1,920 mg/kg in the 2-foot sample. Surface sample location H85HSI0022, adjacent to the former location of the possible moving target, contained lead at a concentration of 4,380 mg/kg. Concentrations of copper and antimony were below the Fort Ord PRGs in all samples. Characterization sampling was conducted to further evaluate the extent of elevated lead concentrations detected in soil samples collected from locations H85HSI0009 and H85HSI0022. Seventeen surface soil samples were collected in the vicinity of the eight previous site investigation sample locations. Lead concentrations in four of the seventeen sample locations (H85HSC0003, H85HSC0006, H85HSC0007, and H85HSC0008) were above the Fort Ord PRGs.

- **Results HA-80.** Results of the site characterization sampling indicate that there is an area on the southeast side of HA-80 where lead concentrations exceed the IA ROD cleanup goal. Based on these results, the area identified on Plate 2 is recommended for remediation.

- **Results HA-85.** Results of the site characterization sampling indicate that lead concentrations are above the IA ROD cleanup goal in two areas (at the firing line and one on the moving target berm). Based on these results, the two areas identified on Plate 2 are recommended for remediation.

- **Interim Action Assessment.** These areas should be considered for interim action based on the results of the screening risk evaluation (SRE).

Location of IA Area/Description of IA

Two study areas were delineated at Site 39A for the purposes of site characterization. These study areas, labeled HA-80 and HA-85, are shown on Plate 2. The results of the site characterization conducted at HA-80 and HA-85 identified three areas with elevated levels of lead in shallow soil. Each of these locations is designated as an IA area. One of the locations is in HA-80 (39A HA-80) and two locations were identified in HA-85 (39A HA-85). The IA will consist of the removal of shallow soil containing lead at concentrations exceeding the IA ROD cleanup goal at each of the three IA Areas. The locations of IA Areas 39A HA-80 and 39A HA-85 are shown on Plate 2.

Site Geology in IA Area

Most of the land surrounding the East Garrison Ranges (IA Areas 39A HA-80 and 39A HA-85) is vegetated dune sand. The surface soil at the firing ranges is unpaved and firm in most locations. Groundwater in this area is approximately 160 feet below ground surface. These geological conditions meet IA excavation activities criteria.

Biological and Cultural Clearances and Ecological Assessment

The biological clearance memorandum is presented in Attachment B. Results of the biological clearance indicated that no special-status species were observed onsite, and that no special-status species will be adversely impacted by the proposed excavation activities at IA Areas 39A HA-80 and 39A HA-85. The California tiger salamander, federally listed as a threatened species, is known to occur in the vicinity of IA Areas 39A HA-80 and 39A HA-85. The IA areas are located within a HMP Development parcel with no resource conservation or management requirements; however, if a California tiger salamander is discovered during the interim action, the contractor shall immediately notify the Directorate of Environmental and Natural Resources Management (DENR) to arrange for the collection or relocation of the animal. In the attached biological clearance, mitigation measures are recommended to minimize potential impacts associated with soil excavation activities.

The site was cleared for cultural and historical resources in the *Cultural Resources Literature Review and Comparison to Locations of Planned Intrusive Activities, Fort Ord, California*, dated December 7, 1993. The biological inspection, the necessary clearance documents, and a summary of the ecological assessment are attached to this document.

A qualitative Ecological Risk Assessment (ERA) for IA Areas 39A HA-80 and 39A HA-85 is presented in Attachment C. The ERA indicated that lead is present in soil at unacceptable levels for ecological receptors at 39A HA-80 and 39A HA-85. Antimony was also detected above the protective mammal screening values at both sites. However, the average antimony concentrations at both sites are within the range of background soil concentrations for antimony at Fort Ord. Also, high antimony and lead concentrations are well correlated at 39A HA-80 and 39A HA-85. Therefore, removal of lead concentrations above the cleanup goal is expected to result in acceptable levels of antimony in soil at 39A HA-85 for ecological receptors. The ERA showed that copper concentrations are at acceptable levels at 39A HA-80 and 39A HA-85. Given that 39A HA-80 and 39A HA-85 consist of low- to medium-quality habitat, no special-status species have been observed at the sites, and the IA for removal of elevated lead concentrations in soil is expected to reduce other metals concentrations to acceptable levels for ecological receptors, a quantitative ERA is not required for 39A HA-80 or 39A HA-85.

Screening Risk Evaluation (SRE) for Human Health

Attachment D presents the SRE that was performed to evaluate the need for further action at 39A HA-80 and 39A HA-85 based on risks to human health from exposure to metals in soil at the sites. The IAROD identifies a Remedial Action Objective (RAO) for IA areas as aggregate human health risk estimates of: (1) one-in-one million (1E-06) excess cancer risk or lower and (2) a hazard index of 1 or less to address possible noncancer health risks. The SRE was conducted by comparing maximum concentrations of chemicals detected in soil samples at HA-80 and HA-85 to USEPA Region IX residential soil preliminary remediation goals (PRGs) in *Region 9 Preliminary Remediation Goals, October 1, 2002*. Noncancer hazard estimates were calculated for antimony and copper at both sites and compared with the RAO noncancer hazard index (HI) of 1. None of the metals detected in soil at the sites are known or suspected human carcinogens. Therefore, cancer risk estimates were not calculated in the SRE. For lead, the Cal/EPA DTSC LeadSpread model, Version 7 was used to predict blood-lead concentrations for residents. The estimated blood-lead concentrations were compared with a regulatory level of 10 micrograms per deciliter (µg/dL).

The SRE indicated that lead is present in soil at unacceptable levels for human health at 39A HA-80 and 39A HA-85. Blood-lead levels for children and adults were estimated above 10 µg/dL at both sites. Antimony is also present in soil above the USEPA Region IX PRG at one location (H85SI0022), at 39A HA-85. However, the maximum detected concentration of lead (4,380 mg/kg) at 39A HA-85 was also detected at this location. Therefore, removal of elevated lead concentrations in soil is expected to reduce antimony concentrations to acceptable levels for human health. Copper was detected well below USEPA PRGs in soil at the two sites indicating that copper is not present at unacceptable levels in soil at 39A HA-80 and 39A HA-85.

In conclusion, results of the SRE show that lead may contribute to adverse health risks exceeding the RAO criteria. Antimony and copper and not expected to contribute substantially to the exceedance of the RAO criteria.

IA Area Chemicals and TCC Development

Based on the results of the qualitative ERA and SRE, lead is present in soil at IA Areas 39A HA-80 and 39A HA-85 at levels exceeding the RAO criteria. Therefore, removal of lead-contaminated soil above the Target Cleanup Concentration (TCC) would meet the RAO risk objectives for both sites. In the IAROD, a TCC for lead of 240 mg/kg was adopted for IA sites. This TCC is equal to the Fort Ord-specific PRG developed in the *Draft Final Technical Memorandum, Preliminary Remediation Goals, Fort Ord, California*, dated June 24, 1994. This concentration is also similar to the 99th percentile lead PRG for a child resident of 220 mg/kg, developed using the LeadSpread model presented in Tables D-3 and D-4 in Attachment D. The TCC for lead in soil of 240 mg/kg is also considered protective of ecological species at the sites, based on ecological risk evaluations conducted at other Fort Ord sites and documented in the *Revision C Work Plan, Ecological Risk Assessment for Small Arms Ranges, Habitat Areas, Multi-Range Area, Former Fort Ord, California,* dated May 5, 2003, and the *Draft Final Post-Remediation Risk Assessment, Site 3, Fort Ord, California,* dated August 3, 2000.

The TCCs adopted in the IAROD and developed in the *Draft Final Technical Memorandum, Preliminary Remediation Goals, Fort Ord, California*, dated June 24, 1994 for antimony and copper are 27 and 2,500 mg/kg, respectively. These TCCs will be applied at IA Areas 39A HA-80 and 39A HA-85, although removal of lead concentrations in soil above the TCC of 240 mg/kg is expected to result in antimony and copper concentrations below their respective TCCs.

The IAROD also indicates that the protection of groundwater quality will be evaluated. The *Draft Technical Memorandum: Approach to Evaluating Potential Groundwater Quality Impacts, Fort Ord,*

California, dated July 29, 1993, presents an analysis that indicates that cleanup of soil to the TCCs is expected to prevent adverse impacts to groundwater. Achievement of the RAO addressing potential groundwater impacts will be documented in the confirmation report for the IA Areas 39A HA-80 and 39A HA-85 interim action.

Confirmation Samples

After the excavations are completed, confirmation samples will be collected. Ten samples will be collected from the bottom of the excavation at IA Area 39A HA-80 and 10 samples will be collected from the bottom of the excavations at IA Area 39A HA-85, including 8 samples from the bottom of the larger excavation and two samples from the smaller excavation. All samples will be analyzed using the test methods listed in Table 2. Since the excavations will be shallow, no sidewall samples will be collected. Additional samples may be collected if the excavation volume exceeds 1,500 cubic yards (cy) as outlined in the *Final Interim Action Feasibility Study Impacted Surface Soil Remediation, Fort Ord, California* (IAFS), dated November 4, 1993. In accordance with the IAFS, stockpiled soil will be sampled at a rate of one sample per 100 cy of soil, using the test methods in Table 2.

Laboratory Test Methods

Confirmation and stockpile samples will be analyzed by standard EPA test methods as presented in Table 2.

Estimated Excavation Volume

The estimated volume of excavated soil is 600 cy from IA Area 39A HA-80, and 300 cy from IA Area 39A HA-85. The volumes are based on conducting excavations in three areas to remove contaminants exceeding PRGs. The volume at IA Area 39A HA-80 is based on excavating a 100 foot wide by 125 foot long area to a depth of approximately 1 foot bgs and an adjacent 25 foot wide by 50 foot long area to a depth of approximately 1 foot (Plate 2). A small area (25 foot wide by 50 foot long) within the larger IA Area 39A HA-80 excavation will be excavated an additional 1-foot bgs to a total depth of 2 feet bgs.

The volumes at IA Area 39A HA-85 are based on conducting excavations at two locations: a 100 foot wide by 75 foot long area to a depth of approximately 1 foot bgs and a 15 foot wide by 10 foot long area to a depth of approximately 1 foot bgs (Plate 2). Additionally, a small area (25 foot wide by 50 foot long) within the larger IA Area 39A HA-85 will be excavated an additional 1-foot bgs to a total depth of 2 feet bgs. The quantity of excavated material will not exceed 1,500 cy without verbal authorization from the EPA, DTSC, and RWQCB. This estimated excavation quantity is below the IAROD maximum excavation limit of 5,500 cy for any single IA area.

Expected Treatment and Final Disposition of Excavated Soil

Excavated soil will be stockpiled onsite and sampled as described above. All stockpiled soil will be placed on and covered with plastic sheeting pending the results of stockpile sampling. Disposal options for stockpiled soil will be evaluated based on analytical results. Stockpiled soil deemed to be hazardous will be transported as a regulated or hazardous soil to a Class I or II landfill via a licensed hazardous waste hauler, unless an alternative disposal method is approved by the appropriate regulatory agencies. Cumulative totals will be recorded for all soil sent off Fort Ord for treatment, disposal, or recycling and will be available for agency review.

The excavated area will be graded to match existing topography using soil adjacent to the excavations. If necessary, soil may be imported to complete backfilling.

Confirmation Report

A summary of IA field activities and the results of confirmation sampling will be presented in a confirmation report, as described in the IAROD. This report will include, at a minimum:

- Copies of waste manifests for the excavated soil, if applicable;
- A site map showing the limits of the excavation and location of confirmation samples;
- A brief documentation of field activities, including a discussion of any agency-approved deviations or modifications to the Approval Memorandum;
- Records of backfill compaction and density tests (not required at these sites);
- Chain of custody forms and laboratory analytical results for soil samples taken from the IA area;
- A map showing the vertical and horizontal extent of excavated soil and remaining chemical concentrations in any impacted soil left in place after the IA; and
- A determination of whether RAOs have been achieved at the IA area. This determination may be used as the basis for subsequent decision documents that indicate that all necessary remedial actions have been taken at the area, in accordance with CERCLA 120(h)(3), and thus the area is suitable for transfer by deed.
- Planned future remediation or characterization activities, if any, that are apparent at the time of the preparation of the confirmation report.

Please feel free to contact me at (831) 242-7918 with any questions you may have regarding these proposed IA activities. Following approval of this memorandum, notification will be placed in a major local newspaper no later than 2 weeks before IA activities begin. Your prompt attention to this action is sincerely appreciated.

Sincerely,

Gail Youngblood
BRAC Environmental Coordinator

Enclosures
Table 1 – Fort Ord Site Eligibility Checklist for Potential Interim Action Areas
Table 2 – Maximum Detected Chemical Concentrations and Target Cleanup Concentrations at IA Areas 39A HA-80 and 39A HA-85
Plate 1 – Location Map
Plate 2 – Recommended IA Areas 39A HA-80 and 39A HA-85
Attachment A – Fort Ord Clearance Document
Attachment B – Biological Clearance Memorandum
Attachment C – Qualitative Ecological Risk Assessment
Attachment D – Screening Risk Evaluation

TABLES

Table 1. Fort Ord Site Eligibility Checklist for
Potential Interim Action Areas
Recommended IA Area Locations: IA Areas 39A HA-80 and 39A HA-85
Site 39A: East Garrison Ranges
Former Fort Ord, California

Screening Criteria	Response (Yes/No with Explanation)	Comment
Have site characterization activities been completed for the IA area; including establishing Target Cleanup Concentrations, completing an ecological assessment, and performing biological/cultural resource clearances?	YES — TCCs established for Site 39A as well as ecological assessment and resource clearances.	IA excavation can be implemented.
Do results of the biological and cultural resource clearances preclude IA excavation activities?	NO - no biological or cultural impacts identified onsite. Habitat for special-status species present along access routes only.	IA excavation can be implemented, but mitigation measures recommended for access routes.
Based on TCCs, is the estimated extent of impacted soil to be excavated greater than 5,500 cubic yards?	NO - estimated excavation volume is 900 cy.	No variance is required.
Is the estimated depth of impacted soil to be excavated greater than 25 feet below ground surface?	NO - estimated maximum depth of impacted soil is 2 feet below ground surface.	IA excavation can be implemented.
Does the IA area contain wastes that preclude IA excavations, such as medical waste, radionuclides, liquids, or sludges?	NO - areas contain elevated levels of lead in soil.	IA excavation can be implemented.
Will IA excavations impact a structure listed on the National Register of Historic Places?	NO - IA excavations will not impact any buildings.	IA excavation can be implemented.
Is the IA area located within the Coastal Zone?	NO – the IA areas are located approximately 4 miles east of the shoreline.	IA excavation can be implemented.
Will IA excavations detrimentally impact an oak tree greater than 6 inches in diameter and more than 2 feet above the ground?	NO - coast live oak trees are in the vicinity of the IA areas, but not in the excavation areas. Precautions have been outlined on the Biological Clearance Form to avoid impacts.	IA excavation can be implemented.

Table 1 (Cont'd). Fort Ord Site Eligibility Checklist for Potential Interim Action Areas
Recommended IA Area Locations: IA Areas 39A HA-80 and 39A HA-85
Site 39A: East Garrison Ranges
Former Fort Ord, California

Screening Criteria	Response (Yes/No with Explanation)	Comment
Do results of the ecological assessment recommend a quantitative ecological risk assessment?	NO – The project area is considered known upland habitat for the federally threatened California tiger salamander (CTS). No CTS or other special-status species have been observed at the sites. Given that 39A HA-80 and 39A HA-85 consist of low- to medium-quality habitat, no special-status species have been observed at the sites, and the IA for removal of elevated lead concentrations in soil is expected to reduce other metals concentrations to acceptable levels for ecological receptors, a quantitative ERA is not required for 39A HA-80 or 39A HA-85.	IA excavation can be implemented.

Comments: Acceptable site for Interim Action

Recommendation:

Based on the above screening responses, this area is applicable for an Interim Action excavation as outlined in the IAROD

Abbreviations:

DTSC	Department of Toxic Substances Control
EPA	Federal Environmental Protection Agency
IA	Interim Action
RWQCB	Regional Water Quality Control Board
PRG	Preliminary Remediation Goal
TCC	Target Cleanup Concentration

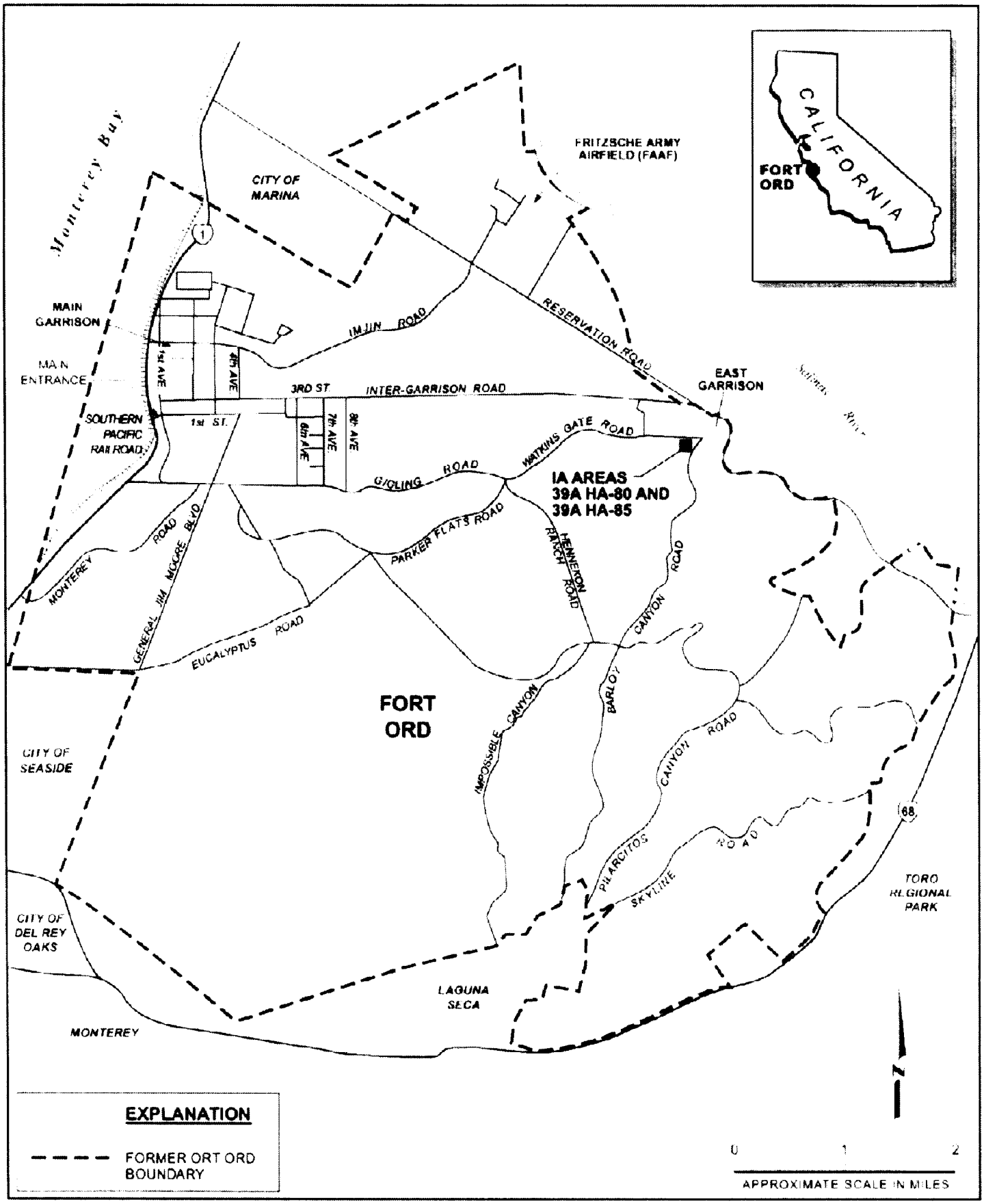
Table 2. Maximum Detected Chemical Concentrations and Target Cleanup Concentrations at IA Areas 39A HA-80 and 39A HA-85
Site 39A: East Garrison Ranges
Former Fort Ord, California

Chemical	Maximum Detected Concentration in Soil (mg/kg)	Target Cleanup Concentration [a] (TCC) (mg/kg)	Confirmation Sample EPA Test Method
INORGANICS			
Antimony	94.7	27	6010B
Copper	107	2,500	6010B
Lead	4,380	240	6010B

mg/kg Milligrams per kilogram

[a] Fort Ord PRG (unless indicated otherwise) as the *Draft Final Technical Memorandum, Preliminary Remediation Goals, Fort Ord, California*, June 24, 1994, and subsequent addenda.

PLATES

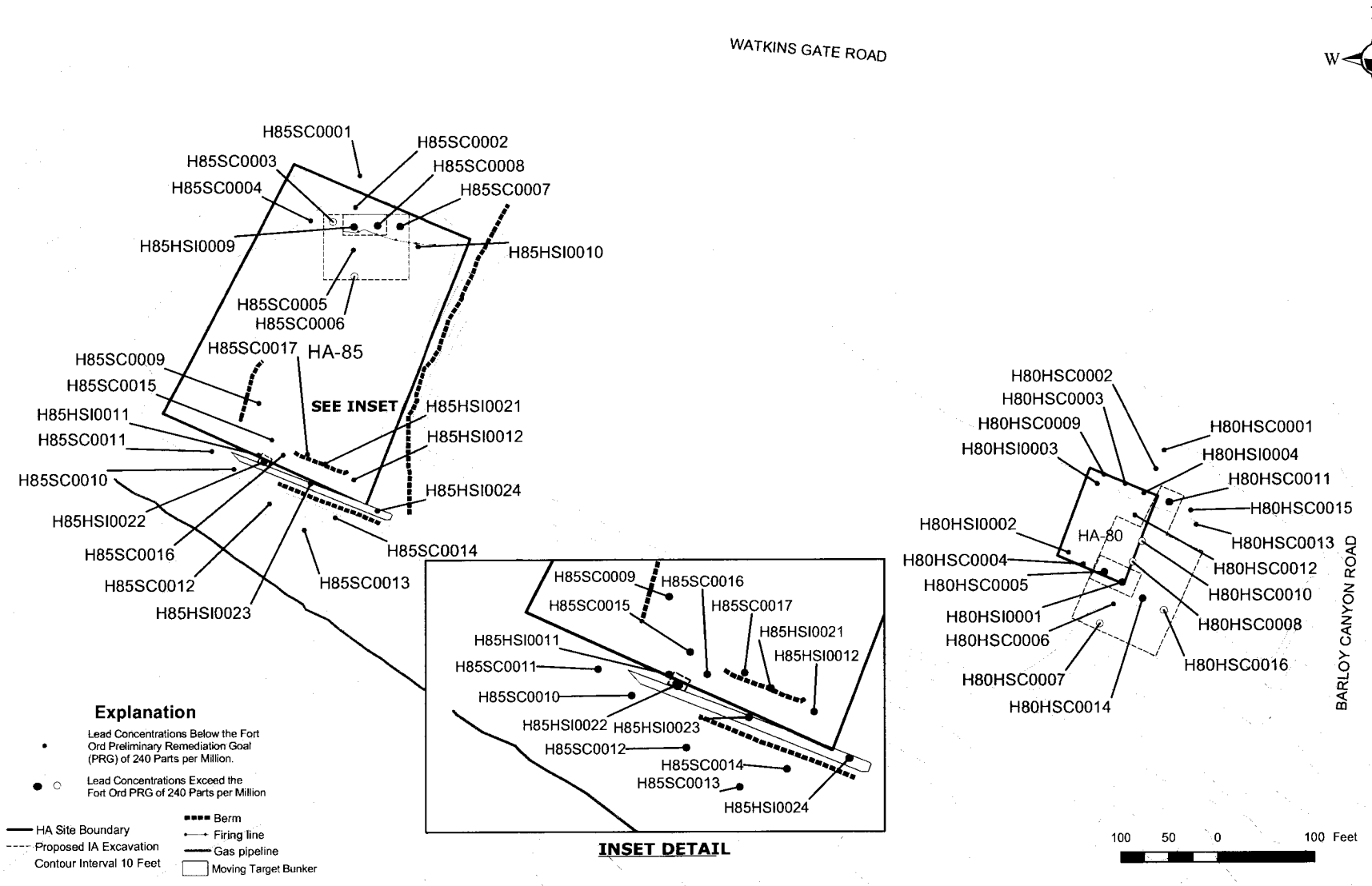


MACTEC

Location Map
Interim Action Approval Memorandum
Site 39A, IA Areas 39A HA-80 and 39A HA-85
Former Fort Ord, Monterey County, California

PLATE **1**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED
CN	4087040808 02		8/04	



DRAWN: PH	PROJECT NO: 4087040806 02
ENGINEER: JF	SCALE: 1"=100'
CHECKED: JF	DATE: 3/05
APPROVED: EJS	DATE: 3/05

MACTEC

Former Fort Ord
Monterey County, California

Recommended IA Areas
39A HA-80 and 39A HA-85
Interim Action Approval Memorandum

PLATE: 2

P:/4080/Fort_Ord_GIS/GIS_Project/Historical_Areas/Site_characterization/HA80_85_Site_Characterization.mxd

ATTACHMENT A

FORT ORD CLEARANCE DOCUMENT

FORT ORD CLEARANCE DOCUMENT SITE 39A — IA Areas 39A HA-80 and 39A HA-85				
	Site Visit Date	**Clearance Date**	**YES**	**NO**
Army Utility Clearance Required?				
Army Utility Clearance	--			X
Name:				
Notes: Site is in an undeveloped area				
Biological Clearance Required?				
Intrusive Location	7/27/04	7/27/04	X	
Name: Graham, Thomas				
Notes: See attached biological inspection form.				
Range Area Access Clearance Required?				
Range Area	--	--		X
Name:				
Notes: Sites were formerly used for the firing of small arms ammunition.				
Geophysical Clearance Required?				
GPR	--			X
EM	--			X
RD400	--			X
Name:				
Notes: Site is in an undeveloped area				
Cultural Resources Clearance Required?				
Historical Structures	--	--		X
COE Architectural Clearance	--	--		X
SHPO Clearance	--	--		X
Name:				
Notes: Site is not in an area identified in the Programmatic Agreement as requiring archaeological clearance.				

FORT ORD CLEARANCE DOCUMENT (Cont'd) SITE 39A — IA Areas 39A HA-80 and 39A HA-85				
	Site Visit Date	**Clearance Date**	**YES**	**NO**
Unexploded Ordnance (UXO) Clearance Required?				
UXO Clearance	--	--		X
Name:				
Notes: Not within an MEC Site				
Borehole Permitting Required?				
Well Permit	--	--		X
Boring Permit	--	--		X
Name:				
Notes: No borings will be completed.				
Utility Clearance Required?				
Clearance	--	--	X	
Name:				
Notes: USA clearance will be completed				
Site Manager Signature:				
Note:				

ATTACHMENT B

BIOLOGICAL CLEARANCE MEMORANDUM

Biological Clearance For Interim Action Areas 39A HA-80 and 39A HA-85

Background. This memorandum is intended to summarize the results of biological clearance activities conducted in advance of soil remediation activities and to provide general guidance for conducting work in the East Garrison.

Soil sampling surveys conducted as part of the Basewide Range Assessment (BRA) have confirmed the presence of high levels of lead at Interim Action (IA) Areas 39A HA-80 and 39A HA-85 located in the East Garrison. A biological clearance was conducted by a MACTEC biologist, Thomas Graham, at the project sites on July 27, 2004.

Resources of Concern. Specific resources of concern identified in the Fort Ord Installation-Wide Multispecies Habitat Management Plan (HMP) (*USACE, 1997*) as potentially occurring on the former Fort Ord include: Hooker's manzanita (*Arctostaphylos h. hookeri*), Toro manzanita (*Arctostaphylos montereyensis*), sandmat manzanita (*Arctostaphylos pumila*), coast wallflower (*Erysimum ammophilum*), Monterey ceanothus (*Ceanothus cuneatus rigidus*), Monterey spineflower (*Chorizanthe p. pungens*), Seaside bird's beak (*Cordylanthus rigidus* var. *littoralis*), Eastwood's goldenbush (*Ericameria fasciculata*), sand gilia (*Gilia tenuiflora arenaria*), Contra Costa goldfields (*Lasthenia conjugens*), California tiger salamander (*Ambystoma californiense*), and black legless lizard (*Anniella pulchra nigra*). Coast live oak (*Quercus a. agrifolia*), woodland is considered to be potential habitat for the Monterey ornate shrew (*Sorex ornatus salarius*) and the Monterey dusky-footed woodrat (*Neotoma fuscipes luciana*).

Parcel Information. The HMP for former Fort Ord outlines resource conservation and management requirements for reuse parcel owners. These management requirements are dependent upon parcel designation. The project sites are identified as being located within reuse Parcel E11B.5 of the HMP. Parcel E11B.5 was designated as development with reserve areas or development with restrictions; however, to resolve land use conflicts posed by competing requests in the East Garrison area, and to meet Monterey County's need for developing work-force housing at the former Fort Ord, Monterey Peninsula College, Monterey County and the Fort Ord Reuse Authority agreed to an exchange of uses between Parker Flats and East Garrison areas. The boundaries for the development footprint of the East Garrison were increased. This increase will be offset by establishing new designated habitat areas at Parker Flats (*Zander Associates, 2002*). During the exchange of uses between Parker Flats and East Garrison areas, the parcel number of the project sites (formerly Parcel E11b.5) was changed to L23.3.3.1, a HMP development parcel. No resource conservation or management requirements are associated in development parcels.

Results and Discussion. The following is a brief summary of the project site and specific mitigation measures that should be followed to avoid and/or reduce potential impacts to sensitive habitat and other resources of concern during soil excavation activities.

Bioclearance was performed on 39A HA-80 and 39A HA-85 to allow for soil excavation activities at the project sites.

39A HA-80 - The eastern edge of 39A HA-80 and the area just east of 39A HA-80 require soil remediation. The area of remediation is located in a mixture of coastal scrub and coast live oak woodland habitat. Plant species observed included slender wild oat (*Avena barbata*), coyote brush (*Baccharis pilularis*), soft chess (*Bromus hordeaceous*), Hottentot fig (*Carpobrotus edulis*), croton (*Croton californicus*), California blackberry (*Rubus ursinus*), curly dock (*Rumex crispus*), coast live oak (*Quercus a. agrifolia*), and poison oak (*Toxicodendron diversilobum*). A mature stand of coast live oaks is located east of the remediation area. A short row of willows (*Salix* sp.) is located on the western edge of

39A HA-80. One Hooker's manzanita (*Arctostaphylos h. hookeri*) was observed just southwest of 39A HA-80. An unpaved road access road is located east of 39A HA-80.

Wildlife observed at 39A HA-85 was limited to small rodent burrows; however, due to the proximity of a known California tiger salamander breeding pool, the salamander may be encountered during excavation activities.

Mitigation. The following mitigation measures are recommended to minimize potential impacts associated with soil excavation activities:

- Resources of concern and habitat protection requirements that are relevant to the work at hand will be communicated to all personnel working at the site prior to starting soil excavation activities.
- No parking or movement of vehicles or equipment will occur within the drip lines of oaks. If trimming of coast live oak tree branches is required, branches should be trimmed with a saw using proper pruning procedures to ensure regeneration of cut branches and to reduce the potential for disease and insect infestation. Trimmed branches shall be cut back to the nearest branching point.
- In the event that a black legless lizard or a California tiger salamander is encountered during soil remediation, the Directorate of Environmental and Natural Resource (DENR) specialist will be contacted for further instructions. Only a biologist authorized by DENR can handle the California tiger salamanders discovered during the remedial action.

39A HA-85 - Three areas of 39A HA-85 require soil remediation. Grassland habitat dominates 39A HA-85. Plant species observed included slender wild oat, black mustard (*Brassica nigra*) coyote brush, soft chess, croton, cut-leaved plantain (*Plantago* coronopus), curly dock, and poison oak. A small stand of coast live oaks is located atop a berm east of 39A HA-85. A stand of Eucalyptus (*Eucalyptus* sp.) is located on the northwestern corner of 39A HA-85.

Wildlife observed at 39A HA-85 was limited to small rodent burrows; however, due to the proximity of a known California tiger salamander breeding pool, the salamander may be encountered during excavation activities.

Mitigation. The following mitigation measures are recommended to minimize potential impacts associated with interim action (soil excavation) activities:

- Resources of concern and habitat protection requirements that are relevant to the work at hand will be communicated to all personnel working at the site prior to starting soil excavation activities.
- No parking or movement of vehicles or equipment will occur within the drip lines of oaks. If trimming of coast live oak tree branches is required, branches should be trimmed with a saw using proper pruning procedures to ensure regeneration of cut branches and to reduce the potential for disease and insect infestation. Trimmed branches shall be cut back to the nearest branching point.
- In the event that a black legless lizard or a California tiger salamander is encountered during soil remediation, the DENR specialist will be contacted for further instructions. Only a biologist authorized by DENR can handle the California tiger salamanders discovered during the remedial action.

REFERENCES

U.S. Army Corps of Engineers (USACE), 1997. *Installation-Wide Multispecies Habitat Management Plan for Former Fort Ord, California*. April.

Zander Associates, 2002. *Assessment, East Garrison - Parker Flats Land Use Modifications, Fort Ord, California*. May.

ATTACHMENT C

QUALITATIVE ECOLOGICAL RISK ASSESSMENT

Qualitative Ecological Risk Assessment
IA Area 39A HA-80 and 39A HA-85

This Attachment provides a qualitative ecological risk assessment (ERA) for 39A HA-80 and 39A HA-85. This ERA follows the basic approach for conducting screening-level ERAs at Fort Ord, as described in the *Basewide Remedial Investigation/Feasibility Study, Volume IV, Ecological Risk Assessment Fort Ord, California (HLA, 1995)*, although in abbreviated form.

Following is a brief description of ecological habitats present onsite at 39A HA-80:

- The site is undeveloped, vegetated with a mixture of coastal scrub and coast live oak woodland habitat.
- Nine plant species, including slender wild oat (*Avena barbata*), coyote brush (*Baccharis pilularis*), soft chess (*Bromus hordeaceous*), Hottentot fig (*Carpobrotus edulis*), croton (*Croton californicus*), California blackberry (*Rubus ursinus*), curly dock (*Rumex crispus*), coast live oak (*Quercus a. agrifolia*), and poison oak (*Toxicodendron diversilobum*) were observed onsite during the biological clearance. None of these species are considered to be of special-status. However, the coast live oak (*Quercus a agrifolia*) provides potential habitat for the Monterey ornate shrew (*Sorex ornatus salarius*) and the Monterey dusky-footed woodrat (*Neotoma fuscipes luciana*).
- Several small rodent burrows were observed at the site. No wildlife species of special concern were observed.
- One Hooker's manzanita (*Arctostaphylos h. hookeri*), a Fort Ord Habitat Management Plan (HMP) resource of concern, was observed just southwest of 39A HA-80 but not onsite.

Following is a brief description of ecological habitats present onsite at 39A HA-85:

- The site is undeveloped, vegetated with grassland.
- Plant species observed onsite during the biological clearance included slender wild oat, black mustard (*Brassica nigra*), coyote brush, soft chess, croton, cut-leaved plantain (*Plantago* coronopus), curly dock, and poison oak. A small stand of coast live oaks is located atop the berm east of 39A HA-85. A stand of Eucalyptus (*Eucalyptus* sp.) is located on the northwestern corner of 39A HA-85.
- Several small rodent burrows were observed at the site. No wildlife species of special concern were observed.

Terrestrial plants, invertebrates, and wildlife could be exposed to metals contamination in soil at the two sites through direct contact/uptake, ingestion of soil, and ingestion of contaminated food items. Table C-1 presents a comparison of average chemical concentrations in soil at 39A HA-80 and 39A HA-85 to ecological screening benchmarks for plants and invertebrates compiled by Oak Ridge National Laboratory (ORNL; *Efroymson et al., 1997a, 1997b*). Table C-1 also presents ecological soil screening levels (EcoSSLs) developed by the U.S. Environmental Protection Agency (*USEPA; 2003a, 2003b*) for antimony and lead in soil for plants, invertebrates, birds, and wildlife. There are no EcoSSLs available for copper. Following is a summary of the comparison of site concentrations with the screening levels:

- Average antimony concentrations in soil at both sites exceed the EcoSSL for mammals of 0.29 mg/kg. Average antimony concentrations are roughly equivalent to or are below other screening levels.

- Average copper concentrations in soil at both sites are below the ORNL screening levels for plants and invertebrates.

- Average lead concentrations in soil at both sites exceed the ORNL and EcoSSL for plants and the EcoSSLs for birds and mammals.

This ERA indicates that lead is present in soil at unacceptable levels for ecological receptors at Interim Action (IA) Areas 39A HA-80 and 39A HA-85. Antimony was also detected above the mammal EcoSSL at both sites. However, the average antimony concentrations of 1.7 mg/kg for 39A HA-80 and 5.1 mg/kg for 39A HA-85 are within the range of background soil concentrations for antimony at Fort Ord, which range up to 8.2 mg/kg (*HLA, 1993*). Copper concentrations at 39A HA-80 and 39A HA-85 are below ecological screening values. Given that 39A HA-80 and 39A HA-85 consist of low- to medium-quality habitat, no special-status species have been observed at the sites, and the IA for removal of elevated lead concentrations in soil is expected to reduce other metals concentrations to acceptable levels for ecological receptors, a quantitative ERA is not required for 39A HA-80 or 39A HA-85.

REFERENCES

Efroymson, R.A., M.E. Will, G.W. Suter II, and A.C. Wooten, 1997a. *Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Terrestrial Plants: 1997 Revision.* Oak Ridge National Laboratory, Oak Ridge, TN. 128 pp. ES/ER/TM-85/R3.

R.A. Efroymson, M.E, Will, and G.W. Suter II, 1997b. *Toxicological Benchmarks for Contaminants of Potential Concern for Effects on Soil and Litter Invertebrates and Heterotrophic Processes: 1997 Revision.* Oak Ridge National Laboratory, Oak Ridge TN. ES/ER/TM-126/R2.

Harding Lawson Associates (HLA), 1993. *Draft Final Basewide Background Soil Investigation, Fort Ord, California.* March.

_____, 1995. *Basewide Remedial Investigation/Feasibility Study, Volume IV, Ecological Risk Assessment Fort Ord, California.*

USEPA, 2003a. *Ecological Soil Screening Levels for Antimony.* OSWER Directive 9285.7-61. Interim Final.

USEPA, 2003b. *Ecological Soil Screening Levels for Lead.* OSWER Directive 9285.7-70. Interim Final.

ATTACHMENT D

SCREENING RISK EVALUATION

Screening Risk Evaluation
IA Area 39A HA-80 and 39A HA-85

This Attachment presents the Screening Risk Evaluation (SRE) for 39A HA-80 and 39A HA-85 to evaluate the need for further action at 39A HA-80 and 39A HA-85 based on risks to human health from exposure to metals in soil at the sites. The SRE was conducted by comparing maximum concentrations of chemicals detected in soil samples at 39A HA-80 and 39A HA-85 to U.S. Environmental Protection Agency (USEPA) Region IX residential soil preliminary remediation goals (PRGs; *USEPA, 2002*). The USEPA PRG values are concentrations in soil that are considered protective of human health under specific, default exposure conditions. The residential exposure scenario addresses both adult and child exposures associated with residential site use through the following pathways: soil ingestion, inhalation of particulates and/or volatiles, and dermal contact. The SRE using USEPA residential soil PRGs was conducted for antimony and copper which were detected in soil samples above Fort Ord background concentrations (*HLA, 1993*) at both sites.

For lead, the USEPA and California Environmental Protection Agency-Department of Toxic Substances Control (DTSC) apply a different risk assessment methodology. The potential for human health effects from exposure to lead is typically estimated based on blood-lead concentrations. The DTSC LeadSpread model, Version 7 (http://www.dtsc.ca.gov/ScienceTechnology/ledspred.html) was used to predict blood-lead concentrations in this SRE.

Risk Estimates for Antimony and Copper

The chemical-specific noncancer hazard quotient (HQ) resulting from exposure to antimony and copper in soil was calculated using the following equation:

$$\text{Chemical-Specific HQ} = \left[\text{THQ} \times \frac{\text{MaxC}_i}{\text{PRG}_i} \right]$$

where:

THQ	=	Target Hazard Quotient (1 or unity);
$MaxC_i$	=	Maximum detected concentration of chemical "i" in soil (milligrams per kilogram [mg/kg]) from 0 to 2 feet below ground surface (bgs); and
PRG_i	=	USEPA Region IX Residential PRG for chemical "i" in soil (mg/kg) based on noncancer effects.

The individual chemical-specific HQs were then summed to obtain an estimate of the total noncancer hazard index (HI) for each site. For regulatory purposes, an HI of one or less is considered to be an acceptable noncancer hazard level (*USEPA, 1989*).

Antimony and copper are not known or suspected human carcinogens (*USEPA, 2002*). Therefore, cancer risks resulting from exposure to soil at the sites were not calculated.

Tables D-1 and D-2 present the results of the SRE for 39A HA-80 and 39A HA-85, respectively. The total HI for 39A HA-80 is 0.1 which is below the regulatory threshold of 1. This indicates that adverse noncancer health effects from exposure to antimony and copper in soil at 39A HA-80 are not expected. The total HI for 39A HA-85 is 3.1, which is primarily attributed to antimony in soil. Because this HI exceeds the regulatory threshold of 1, there is a potential for unacceptable noncancer risks from exposure

to antimony in soil at 39A HA-85, based on the maximum concentration in soil. However, it is noted that only the maximum concentration of antimony in soil of 94.7 mg/kg (at H85SI0022) exceeds the PRG of 31 mg/kg. The next highest concentration of antimony at 39A HA-85 is 12.2 mg/kg and the average concentration of antimony in soil at 39A HA-85 is 5.1 mg/kg; these concentrations are both below the PRG. The average antimony concentration of 5.1 mg/kg is also within the range of background soil concentrations for antimony at Fort Ord, which range up to 8.2 mg/kg (*HLA, 1993*).

Hazard Evaluation for Lead

Blood-lead concentrations were estimated for adult and child residents for 39A HA-80 and 39A HA-85 using the DTSC's LeadSpread model, Version 7. The LeadSpread worksheets are presented in Tables D-3 and D-4 for 39A HA-80 and 39A HA-85, respectively. The following site-specific parameters were input into the model:

- Lead in drinking water concentration of 0.25 micrograms per liter (µg/L). This is equal to half of the reporting limit for non-detect concentrations of lead in drinking water wells in the Fort Ord vicinity. Lead is routinely non-detect in drinking water wells at Fort Ord.
- Maximum concentrations of lead detected in soil at each site.

All other parameters used in the LeadSpread model were default values.

The 99th percentile blood-lead concentrations estimated using LeadSpread are as follows:

- 39A HA-80: 14.7 micrograms of lead per deciliter of blood (µg/dL) for a child resident and 54.6 µg/dL for an adult resident; and
- 39A HA-85: 167.2 µg/dL for a child resident and 44.2 µg/dL for an adult resident.

These blood-lead concentrations exceed the regulatory level of 10 µg/dL, indicating that there is a potential for adverse health effects for residents potentially exposed to lead in soil at the two sites.

Conclusions of the SRE

This SRE indicates that lead is present in soil at unacceptable levels for human health at IA Areas 39A HA-80 and 39A HA-85. Antimony is also present in soil above the PRG at one location (H85SI0022) at 39A HA-85. However, the maximum detected concentration of lead (4,380 mg/kg) at 39A HA-85 was also detected at this location. Therefore, removal of elevated lead concentrations in soil at IA Area 39A HA-85 is expected to reduce antimony concentrations to acceptable levels. Copper was detected well below USEPA PRGs in soil at the two sites indicating that copper is not present at unacceptable levels in soil at 39A HA-80 and 39A HA-85.

REFERENCES

Harding Lawson Associates (HLA), 1993. *Draft Final Basewide Background Soil Investigation, Fort Ord, California*. March.

U.S. Environmental Protection Agency (USEPA), 1989. *Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part A)*. Office of Emergency and Remedial Response. EPA/540/1-89/002.

_____, 2002. *Region 9 Preliminary Remediation Goals*. Stanford J. Smucker, Regional Toxicologist. October 1.